

REMARKS/ARGUMENTS

Claims 37 and 41 have been amended. Claims 37 and 39-45 are currently pending in this application.

Claims 37 and 39-44 stand rejected under 35 U.S.C. § 102 as being anticipated by Hayashi et al. (U.S. Patent No. 6,265,738) (“Hayashi”). The rejection is respectfully traversed.

The claimed invention relates to integrated circuits having a continuous smooth platinum group metal film formed in the presence of both oxygen and nitrous oxide at a combined flow rate in the range of about 1500 sccm to about 2500 sccm, or under a pressure of from about 10 to about 1000 Torr. As such, independent amended claim 37 recites a capacitor comprising first and second electrodes “wherein at least one of said first and second electrodes is formed of a material selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt” and “wherein at least one of said first and second electrodes has a thickness of about 50 Angstroms to about 1000 Angstroms and is formed of a continuous platinum group metal formed in the presence of both oxygen and nitrous oxide at a predetermined ratio with a combined flow rate in the range of about 1500 sccm to about 2500 sccm.” Independent amended claim 41 also recites a capacitor comprising “a first electrode and a second electrode, wherein at least one of said first and second electrodes is formed of a material selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt” and “wherein at least one of said first and second electrodes has a thickness of about 500 Angstroms to about 700 Angstroms and is a smooth and continuous platinum electrode formed by depositing platinum in a CVD deposition chamber in the presence of both oxygen and nitrous oxide and at a pressure of from about 10 to about 1000 Torr.”

Hayashi relates to a “ferroelectric thin film capacitor . . . (having) smooth electrodes.” (Abstract). According to one embodiment of Hayashi, a ferroelectric capacitor 400 comprises “bottom electrode 412” which is formed of layers 406, 408 and 410 and “which presents a first smooth upper surface 414.” (Col. 7, lines 14-35; Figure

4). Hayashi teaches that the adhesion layer 406 is “about 1000 Å thick,” the diffusion barrier layer 408 is “about 1500 Å thick,” and that the platinum layer 410 “may be 1500 Å thick.” (Col. 7, lines 14-30). Hayashi also teaches that platinum top electrode 422 is 2000 Å thick. (Col. 8, line 4).

Hayashi does not disclose the limitations of the claimed invention. Hayashi does not disclose first and second electrodes “wherein at least one of said first and second electrodes has *a thickness of about 50 Angstroms to about 1000 Angstroms*,” as independent amended claim 37 recites, or “*a thickness of about 500 Angstroms to about 700 Angstroms*,” as independent amended claim 41 recites (emphasis added). As noted above, Hayashi discloses a ferroelectric capacitor comprising a bottom electrode 412 formed of three layers with respective thicknesses ranging from about 1000 Å to 2000 Å. (Col. 7, lines 14-30). Hayashi also discloses a platinum top electrode which is 2000 Å thick. (Col. 8, line 4). Thus, the subject matter of claims 37 and 39-44 is not anticipated by Hayashi.

Claims 37 and 39-44 stand rejected under 35 U.S.C. § 102 as being anticipated by Woo et al. (U.S. Patent No. 6,054,331) (“Woo”). The rejection is respectfully traversed.

Woo relates to a platinum film for a bottom capacitor electrode which “is formed in two separate processes.” (Abstract). According to Woo, “a first thickness platinum part . . . is deposited under an inert gas atmosphere, and the second thickness platinum part is deposited under an atmosphere containing oxygen, nitrogen and/or a mixture thereof as well as an inert gas.” (Abstract). The platinum film is then annealed “to remove the oxygen and/or nitrogen introduced during the deposition of the second thickness platinum part.” (Abstract). In the examples described by Woo, the resulting platinum film has a thickness of 2000 Å. (Col. 10, lines 25-67; Col. 11, lines 1-55).

Woo does not disclose the limitations of the claimed invention. Woo does not disclose first and second electrodes “wherein at least one of said first and second electrodes has *a thickness of about 50 Angstroms to about 1000 Angstroms*,” as independent amended

claim 37 recites, or “*a thickness of about 500 Angstroms to about 700 Angstroms*,” as independent amended claim 41 recites (emphasis added). Woo teaches a bottom platinum electrode formed in a two-step process and having a thickness of 2000 Angstroms, and not in the ranges of the claimed invention. Accordingly, the subject matter of claims 37 and 39-44 is not anticipated by Woo and withdrawal of the rejection of claims 37 and 39-44 is respectfully requested.

The Office Action asserts that the limitations “formed in the presence of both oxygen and nitrous oxide at a predetermined ratio with a combined flow rate in the range of about 1500 sccm to about 2500 sccm” (claim 37) and “formed by depositing platinum in a CVD deposition chamber in the presence of both oxygen and nitrous oxide at a predetermined temperature and at a pressure of from about 10 to about 1000 Torr” (claim 41) “are taken to be a product by process limitation.” (Office Action at 3).

Applicant notes that courts have generally held that a product-by-process claim is a “perfectly acceptable one so long as the claims particularly point out and distinctly claim the product or genus of products for which protection is sought.” See In re Brown, 459 F.2d 531, 535, 173 USPQ 685 (CCPA 1972). A product-by-process claim is allowed when the product cannot be adequately described in any other manner. See Bonito Boats Inc. v. Thunder Craft Boats Inc., 489 U.S. 141, 9 U.S.P.Q.2d 1847 (1989); In re Jochim, 11 U.S.P.Q.2d 1561, 1563 (Bd. Pat. App. & Int’f 1988). This way, “where one has produced an article . . . and where it is not possible to define the characteristics which make it inventive except by referring to the process by which the article is made, he (the applicant) is permitted to so claim his article, but is limited in his protection to articles produced by his method referred to in the claims.” In re Moeller, 117 F.2d 565, 568, 48 U.S.P.Q. 542 (CCPA 1941); See also Scripps Clinic & Research Foundation v. Genentech Inc., 666 F. Supp. 1379, 3 U.S.P.Q.2d 1481 (N.D. Calif. 1987) (“A product-by-process claim is infringed only by a product produced by following the same process described in the claim”).

In the present case, claims 37 and 41 recite limitations which distinctly claim the

product for which protection is sought, that is a capacitor platinum electrode formed as a result of a particular deposition process, "in the presence of both oxygen and nitrous oxide" and under predetermined and specific temperature, pressure and combined flow rate ranges. Because independent claims 37 and 41 recite structural limitations which are the result of these particular deposition parameters and which "cannot be adequately described in any other manner," the product-by-process claims 37 and 41 are "perfectly acceptable one(s)."

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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Version With Markings to Show Changes Made

(three times amended) A capacitor comprising:

a first electrode and a second electrode, wherein at least one of said first and second electrodes is formed of a material selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt;

a dielectric provided between said electrodes; and

wherein at least one of said first and second electrodes has a thickness of about 50 Angstroms to about 1000 Angstroms and is formed of a continuous platinum group metal formed in the presence of both oxygen and nitrous oxide at a predetermined ratio with a combined flow rate in the range of about 1500 sccm to about 2500 sccm.

41. (three times amended) A capacitor comprising:

a first electrode and a second electrode, wherein at least one of said first and second electrodes is formed of a material selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt;

a dielectric provided between said electrodes; and

wherein at least one of said first and second electrodes has a thickness of about 500 Angstroms to about 700 Angstroms and is a smooth and continuous platinum electrode formed by depositing platinum in a CVD deposition chamber in the presence of both oxygen and nitrous oxide at a predetermined temperature and at a pressure of from about 10 to about 1000 Torr.

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